

Amendment Under 37 C.F.R. §1.111
Application No. 10/518,644
Attorney Docket No. 043058

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended): A sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, wherein said sp₃-bonded boron nitride is made by a method comprising converging and emitting ultraviolet laser of from 190nm to 400nm wavelength onto a boron nitride solid raw material or a method comprising irradiating a boron nitride solid raw material with plasma as well as ultraviolet laser of from 190nm to 400nm wavelength.

2. (Currently amended): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, the method comprising: introducing reaction mixed gas containing boron and nitrogen being diluted with dilution gas into a reaction chamber; and irradiating a surface of a substrate placed in the chamber, a growing surface on the substrate, and a growing spacing region about the growing surface with ultraviolet light to cause gas phase as well as surface reactions reaction, thereby generating, depositing, or growing a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region on the substrate.

3. (Currently Amended): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, as claimed in claim 2, wherein the dilution gas is

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noble gas, hydrogen, nitrogen, or mixed gas consisting of two or more of these and the ratio of the reaction mixed gas to the dilution gas is 100:0.0001-100% by volume.

4. (Currently Amended): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, the method comprising: inserting boron nitride as a boron raw material into a reaction chamber while introducing reaction mixed gas containing nitrogen being diluted with dilution gas into the reaction chamber; converging and emitting ultraviolet laser of from 190 nm to 400 nm wavelength onto the boron nitride solid raw material so as to vaporize, generate radical containing boron or BN precursor matter; and irradiating a surface of a substrate placed in the chamber, a growing surface on the substrate, and a growing spacing region about the growing surface with ultraviolet light to cause gas phase reaction between the reaction mixed gas containing nitrogen and the radical containing boron or re-coagulation reaction of the BN precursor matter in the vaporized state, thereby generating, depositing, or growing a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region on the substrate.

5. (Currently Amended): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, the method comprising: inserting boron nitride as a boron raw material into a reaction chamber while introducing reaction mixed gas containing

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boron and nitrogen being diluted with dilution gas into the reaction chamber; irradiating the boron nitride solid raw material with plasma as well as ultraviolet laser of from 190 nm to 400 nm wavelength so as to vaporize, generate radical containing boron or BN precursor matter; and irradiating a surface of a substrate placed in the chamber, a growing surface on the substrate, and a growing spacing region about the growing surface with ultraviolet light to cause gas phase reaction between the reaction mixed gas containing nitrogen and the radical containing boron or re-coagulation reaction of the BN precursor matter in the vaporized state, thereby generating, depositing, or growing a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region on the substrate.

6. (Currently Amended): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, as claimed in claim 4 or 5, wherein the dilution gas is noble gas, hydrogen, nitrogen, or mixed gas consisting of two or more of these and the ratio of the reaction mixed gas to the dilution gas is 100:0-100% by volume.

7. (Original): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, as claimed in claim 4 or 5, wherein the ultraviolet laser is pulse laser.

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8. (Previously presented): A producing method of a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region, as claimed in claim 5, wherein by applying modulation synchronizing laser pulse onto the plasma, the plasma is packeted so as to generate, deposit, and grow a sp₃-bonded boron nitride, represented by a general formula BN, having a hexagonal 5H or 6H polytypic form and having a property of emitting light in ultraviolet region and which has improved crystalline property.

9. Cancelled.

10. Cancelled.

11. Cancelled.

12. Cancelled.

13 (New). An electronic material comprising the sp₃-bonded boron nitride of claim 1.

14 (New). The electronic material of claim 13, wherein said electronic material is a light-emitting diode.

15 (New). A cutting tool comprising a surface coating comprising the sp₃-bonded boron nitride of claim 1.